Menlo Park Notebook #4 [N-78-12-04.2]

This notebook covers the period December 1878-April 1879. Most of the entries are by Edison, Charles Batchelor, and Francis Upton. There are also entries by John Kruesi, John Ott, and George Jackson. Almost all of the material relates to experiments on electric lighting. There are drawings of lamps, including vacuum experiments; drawings of a machine for insulating spiral filaments; and notes, drawings, and calculations about generators, with a series of numbered experiments cross-referenced to other notebooks. There are also notes by Upton taken from a work by John Tyndall on heat; drawings of telephones; drawings of a blowpipe and of a microscope table; Kruesi's notes on work done to the laboratory buildings; and a memorandum by Edison on scrapbook titles. The book contains 282 numbered pages followed by one unnumbered page.

Blank pages not filmed: 114-115, 164-165, 220-245, 248-279.

Missing page numbers: 143-144, 161-162.

No. 4

BOARI

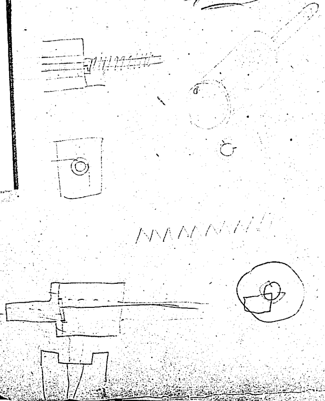
Dec 4 1878

Electric Light

Chas Batchelor
J Kruesi

Machine for filling spirals with insulating substance

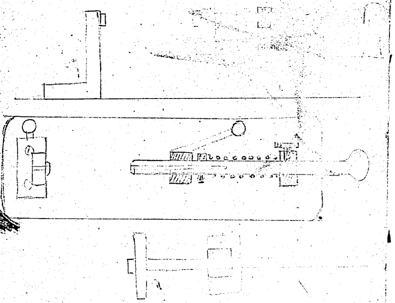
Made by Jackson



Electric Light Dec 2nd 1878

Chas Batchelor

Instrument for pressing spirals under heat



Made by [redacted] 13.

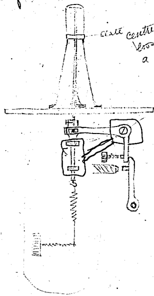
Made by John

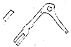
Electric Light Regulator

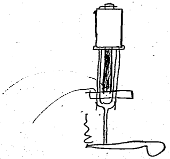
Dec 4 1878

Chas Batchelor
J Kruesi

centre wire fits into slate loose but slate acts as a guide



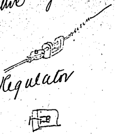




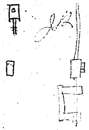
Electric Light

Dec 5th 1878

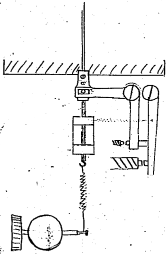
Chas Batchelor



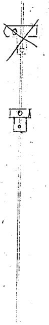
New Regulator



JK

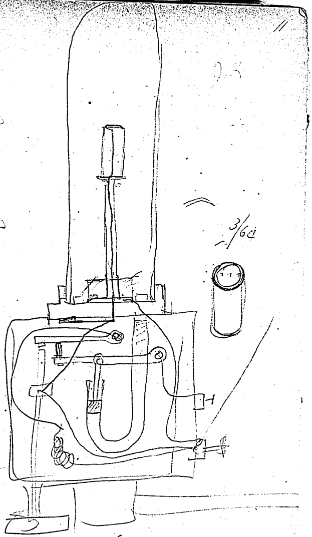


John F Ott



Regulator

Edison Eff

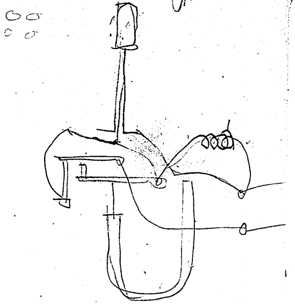


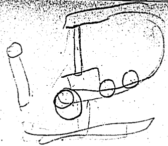
N Boston

Regulator

Dec 5
1878

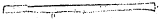
Chas Batchelor



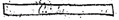


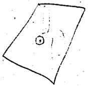
$\frac{1}{50}$,

1.,



1/8





3/8 x 8 inch., 1 ohm,. 1.h.p.
1/4 . . 6. hp

10,

Portland,

Portland.

Portland Portland Portland

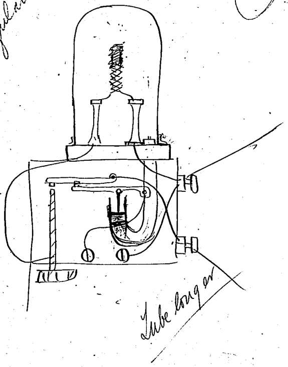
Electric Light

Dec 10th 1878

John F Ott

Chas Batchelor

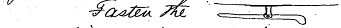
Regulator


Tube longer

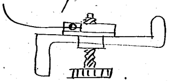
Electric light
Pneumatic Regulator

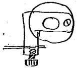
Dec 10 1878.
Chas Batchelor
John F Ott
JR

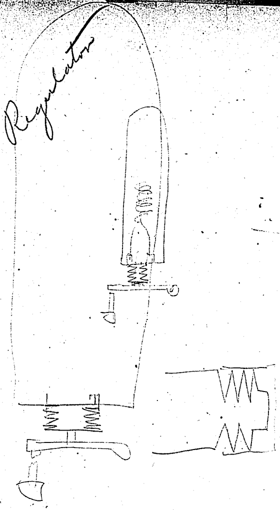
John Ott

Fasten the  lever links to diaphragm permanent as the heat softens the wax and lets it come loose.

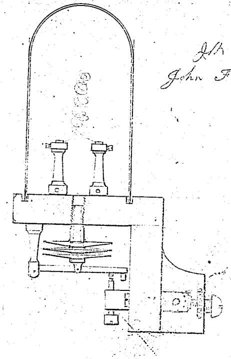
Insulate the adjusting screw so:
And fasten the wire to it





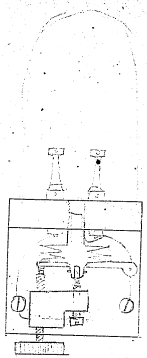

Regulator

Regulator



John F Ott

EL Regulator



JK
John F Ott

Titles of Scrap books,

Electric light.
magnetomachines
Lamps
Carbons
Photometric tests. ✓

Magnetism, of Steel bars.
Researches Connected therewith. ✓

Electro magnetism
All researches on Electromagnets ✓

Induction (Magnetic) ✓

Induction, Static
of Condensers - plate glass machine ✓

Polarization, including
Secondary batteries, ✓

Galvanic batteries, ✓

Thermo Electric Currents, ✓

Conductivity + Resistance
of Matter, ✓

Telephone, ✓

Telegraphy, Fac Simile,

Telegraphy. Duplex Quad. ✓

Telegraphy Automatic, ✓

{Telegraphy. Fire alarm
{Burglar alarm ✓

33,000 $\frac{60}{10}$
600

19,800,000
2,088,000

$\frac{1}{10}$

Horse Power man's power
10 hours
19.800,000 per day ft lbs.

Man lifting himself on ladder.

2,088.000

2.088) 19.800 (9.
18792
0008

Man $\frac{1}{9}$ Horse power raising his own weight.

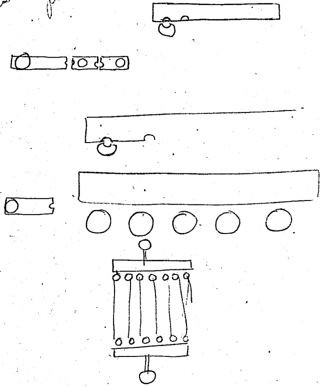
Turning crank or wheel
1,296.000

1.296) 19.800 (15
1296
6840
6480

$\frac{1}{15}$ of a Horse power in turning a crank of a machine.

Resistance coil,
plan of

15
12
180



inch = 1 ohm G.S Wire

.016

21 3/8

.016 Dynamo Edison figures for

Copper = 24.8 feet per ohm

G.S.W. 15.47 times resistance

```
154 / 24.8 | 1.61        1.61
      154
      .940              8 / 61
      .924                  7 5/8
        160
```

~~11 / 24.8~~

~~11~~

~~GS~~ German Silver Wire

.016 when drawn to double its length

11½ inches to 1 ohm

A piece Vulcanized fibre
made accurately

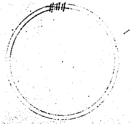
5" long
3" wide
$\frac{1}{8}$" thick

Put in water (Boiling) 1/2 hour

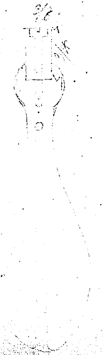
$5\frac{5}{64}$ long
$3\frac{5}{64}$ wide (scant)
5/32 thick

or 5.08
3.07
.15

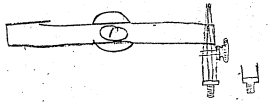
When cold & dry =

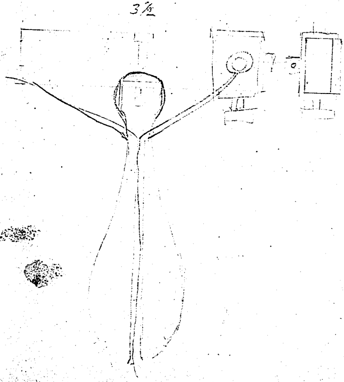


when wet & hot 5 3/16
" cold & dry 5 3/64



For holding wire.





```
22|1880|85
   176
    120
    120

188
 22
376
376
10|4136
   413.6

188
 18
1504
188
3384
7|1692
  241.71

12|2632|146.22

83
1
10
40
36
 4

413.6
  2
8270.4|321.71
18|57
  54
   39
   36
    38
   413.6 | 688
         4

3384
 28
  58
  56
   24
   14
    108
     98
      20

241.71

413.6
  22
8272
8272
10|9099.2
   909.92

413.6
  14
  
22|413.6
   22
   193
   176
    176

413.6
  14
  
  7.442
  531.7
```

Variable counter shaft

Main	Counter	Speeds of counter
22^in	22	413·6
18	18	241·71
14	14	146·22
10	10	85·00

Counter

413·6 =

22 =	10	909·92
18 =	14	531·7
14 =	18	321·7
10 =	22	188·6

241·71

22 =	10	531·7
18 –	14	310·77
14 –	18	188
10 –	22	110

146·22

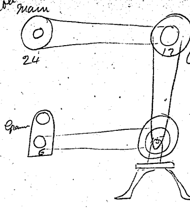
22 :	10	321·68
18 :	14	188
14 ..	18	113
10 ·	22	~~10~~ 63·75

85.

22 ·	10	187
18	14	109
14	18	66
10	22	36

This is bad as it gives unequal speeds

Speed) Countershaft
ariable


main
24
12
Gram
6

Main 188
Counter 376

22 X 10
16 X 16
10 X 22

give three speeds on Gramme machine

2068 rev
940 rev.
428 rev

Counter # 376 = Oly Machine

~~[illegible]~~

Second Counter 15 X 6

22 X 8 = 1034 = 3102

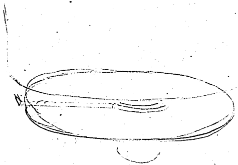
20 X 10 = 752 = 2256

18 X 12 = 565 1695

15 X 15 = 376 1126

12 X 18 = 251 753

10 X 20 188 564



Laboring work

Wrap water pipe from Cistern
To pumps

To digging for setting the trap
Track & to get to all the
pipes.

fill in dig for water pipe
" " " To pond

dig a space for the Office
and for water pipe "
bank up around laboratory

Jan 22d 1879

Carpenter work

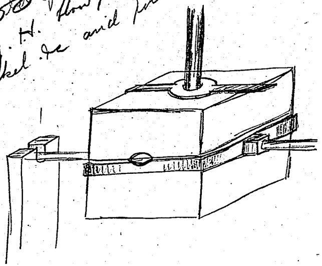
Put in a new Door in middle room
on South side

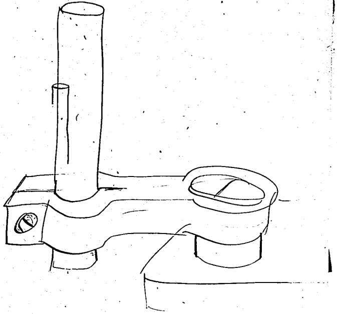
Take sheeting on Front off & put
Tar paper under

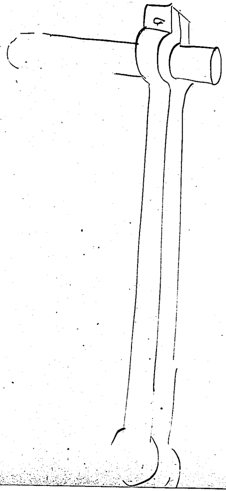
Table for shop

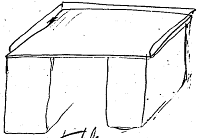
Put in new sink up stairs

~~Method of making~~
Oxy. H. flow pipe to melt
nickel &c and pour in moulds

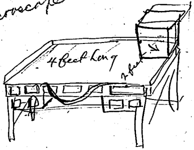





a

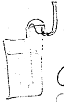


Microscope table.


4 feet long
2 feet

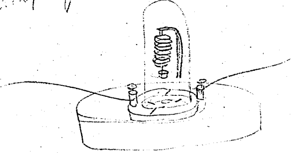
drawers 1 foot long
3 inch deep!

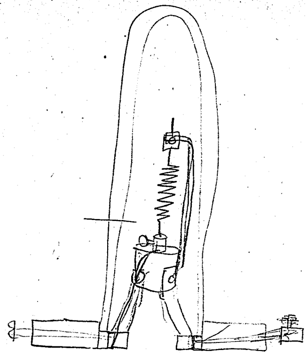
Covered with smooth green Oil Cloth



Protochloride

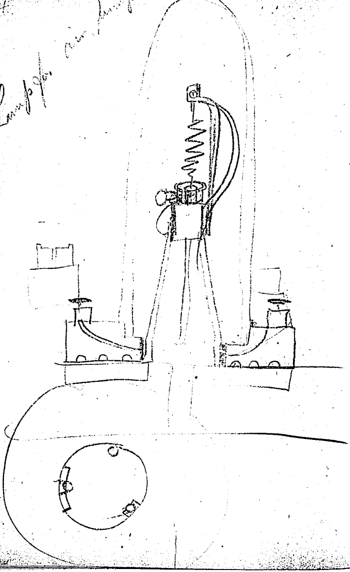
Lamp for air pump



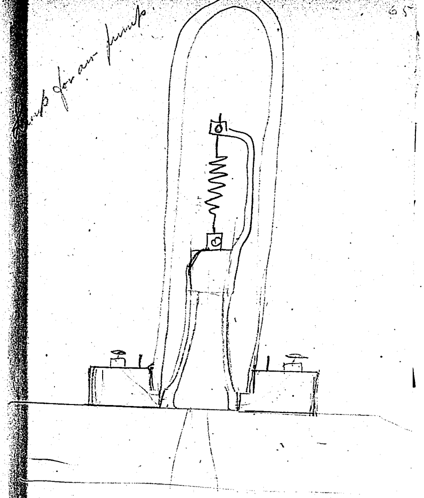


Lamp for Air pump

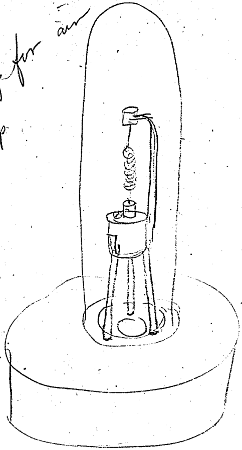
Lamp for air pump

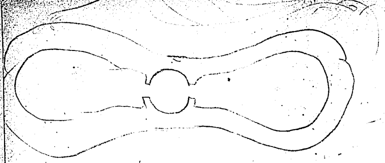


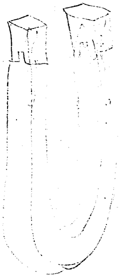
Lamp for air pump.

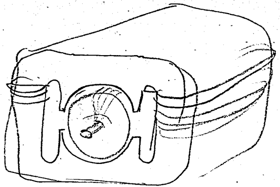


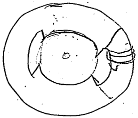
Lamp for air pump.











①

32

20

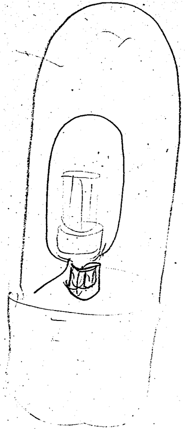
100

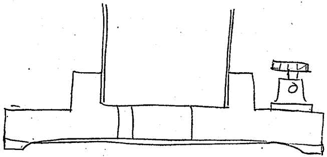
46
4
184
44

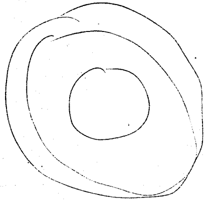
8096.

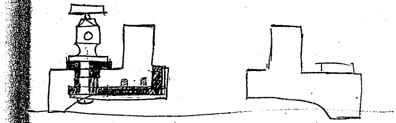
1.50
8
12.00.

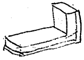
11
10











Feb 15 1879

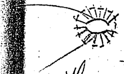
Edisons Magneto Electric Machine

Exp. to get the current out of it

Book No. 34 Chas Batchelor

Pages 77 to 159" Dynamo Notes, Sketches."
Unimportant.

side and commutator moved round a little each time



There is a slight cross between coils 0.7 and 0 8

Found this and got it out

The wire that comes through the groove from armature had worked out and was wedged in between the fibre and the shaft this must be covered in next by hard rubber shell as I have done this

Over

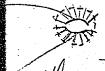
Feb 15 1879

Edisons Magneto Electric Machine

Exp. ~~to get the current out of it~~

Exp No. 34 Chas Batchelor

8 springs connected together on each side and commutator moved round a little each time



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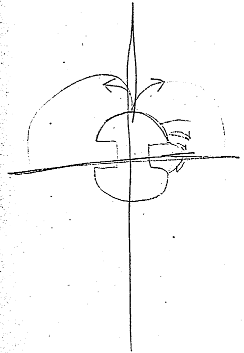
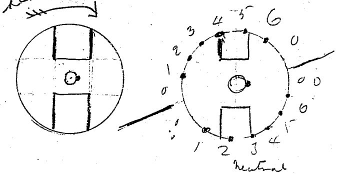
Over



Exp 1

the pole is 90° from where drawn

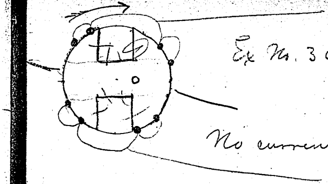

4
5
6
3
2
1
0
0
0 0
6
5
4
3
2
1
neutral

Current quite strong in the commutator

Experiment 35

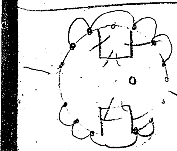
3 + 4 taken off on each side

Ex No. 36



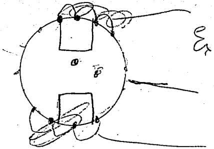
No current

Ex. No. 37

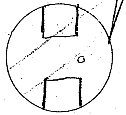


Current

Ex. No. 38



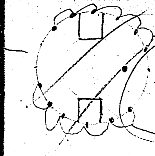
Ex. No. 39



Connected the fixed commutators together so that there are four coils two and two all round

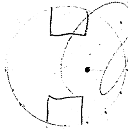
four off of the coms on one side & only 2 on

Ex. No. 40.



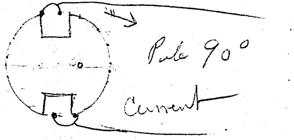
Misalignment

Ex. No. 41.



Commutator
Sparking off

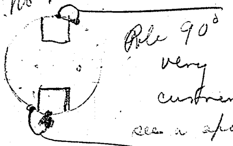
Ex. No. 42 Fixed Com 2 & 2



Pole 90°

Current

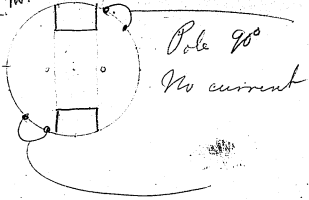
Ex. No. 43



Pole 90°
very faint
current hardly
see a spark and
none at the commutator

750 revolutions

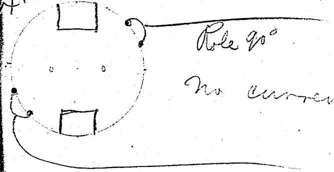
Exp. No. 44   242



Pole 90°

No current

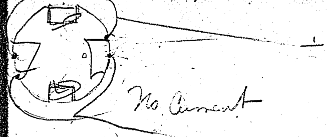
Exp. No. 45



Pole 90°

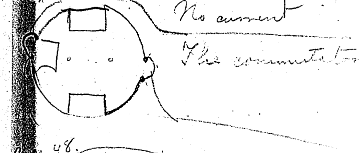
No current

Ex. No. 46 2+2 fixed Com.



No Current

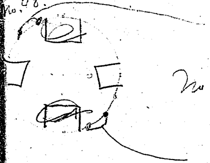
Ex. No 47



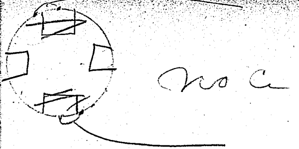
No current

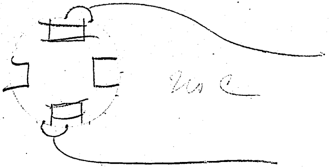
The commutator

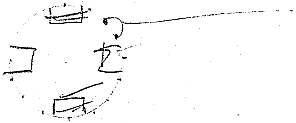
Ex. No. 48.

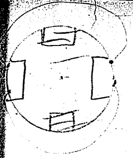


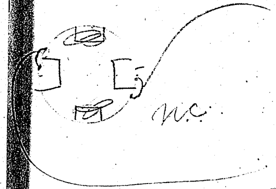
No Current

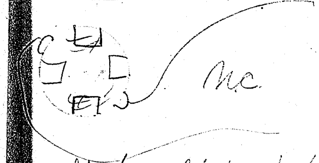

no c


no c

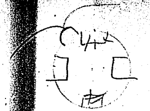




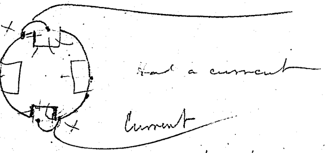




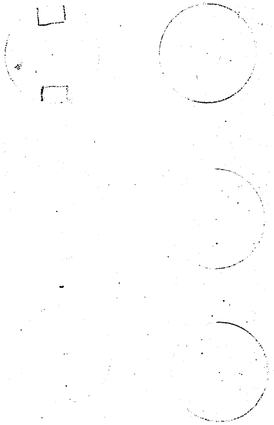
a Shock could be got from the iron to the insulated core



Tried various movements about this so as to get Ex. No. 2 Tested with current [illegible] sounder, found cross between one of the coils and the base.

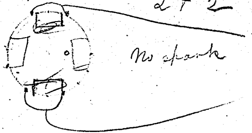

X
Had a current
X
Current

X Last one of the pair [illegible] all the five, was the only one burned.

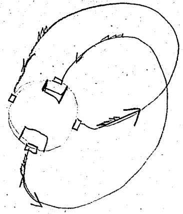


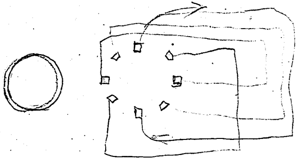
The one wh. breaks the circuit gives the spark,

2 & 2



Connected four and four four fours.





Battery put on the armature

Coils connected
four and four

Current through
the commutators for
the most part. The tension
was extremely high as
sparks could be obtained
through the body as a resistance
very slight

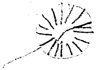
No. 50

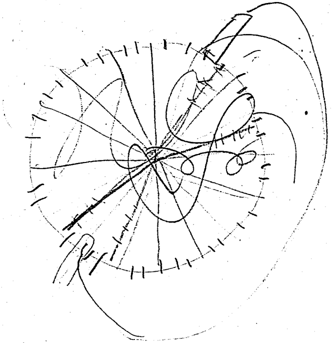
The fixed commutators were fastened in groups of eight and the wires brought to the outside from them. The Gramme machine was then used to run the magnet and a fearful sparking was the result as nearly all the currents were short circuited. The sparks on the commutator were very large.

No 51 One day of the fixed commutators used and a small arc obtained from carbon sticks.

Ex. No, 52 Feb. 16 1879

With one man power, Martin, a fair arc could be obtained from carbon points. A foot of .001 In. Pt was heated. The commutators were connected so that the current [illegible] had to pass through four coils. Large sparks were obtained outside the battery being used to make the field magnets.





Ex. 53. The battery current was put from the top ~~and~~ to the bottom commutator ~~and~~ piece of the Gramme and the ring removed. The current is very little from the sides. Perhaps if the battery current were sent through a different coil it would work.

For diagrams of possible connections and some impossible ones for the new Dynamo machine see.

Book 7 169-175
9 181
28 1-81

Plan of Electric Lamp
Book 9 175

Tyndall estimated the heat given off at white was as 22 times that at below red heat. "Bugs" The radiation from the glass would interfere probably he raised the temp. from low red to white and when white had the radiation from the glass to account for. Then there is a much larger amt of heat stopped by the glass at red heat than at white

figured on figure from Prof. Barker
1 horsepower is
Capable if it could be
turned all into
Electricity of producing
a current which
would be equal to
730 Daniell cells
in a resistance of
730 ohms (Internal & External)

---

1 weber = 43 ft. lb

Feb 18 1879

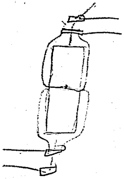
44) 33000 (8
2

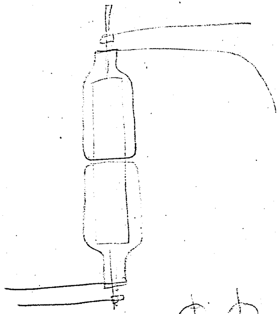
730.

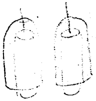
Faraday

2.

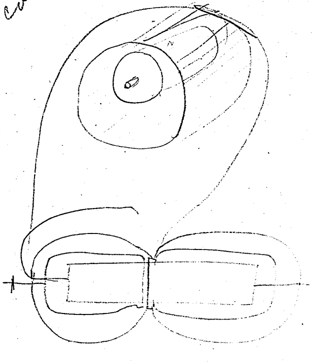
730
60
43800







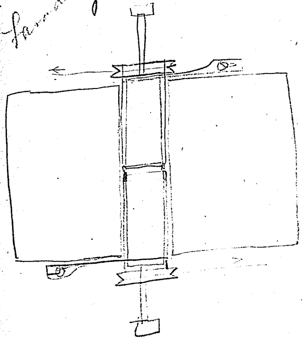
attempt
No commutator — machine.



120

Feb. 19

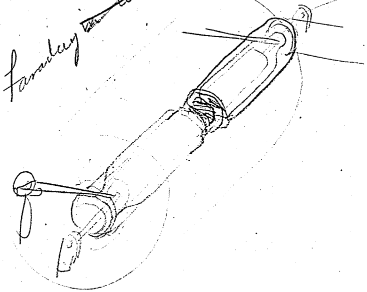
Faraday



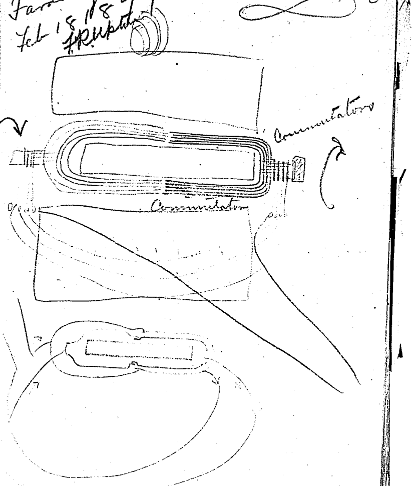
Feb. 19

121

Faraday ~~[illegible]~~

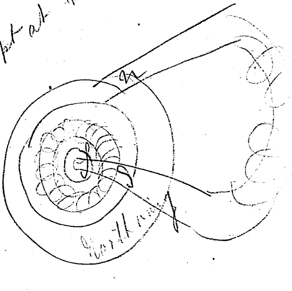


Faraday machine
Feb 18 1879
F.R.Upton

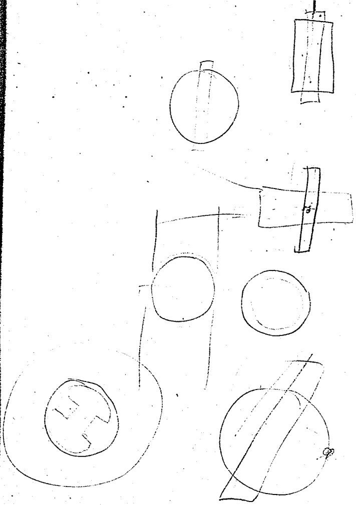

Commutators
Commutator

124

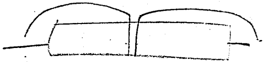
attempt at no commutator

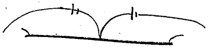


125

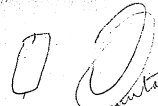


Faraday

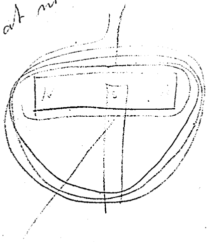




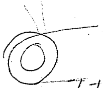
128



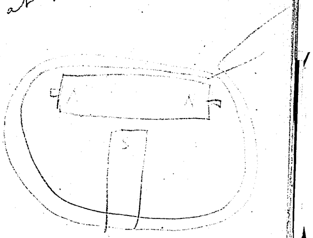
attempt at non commutator

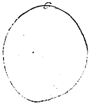


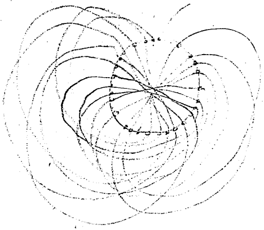
129



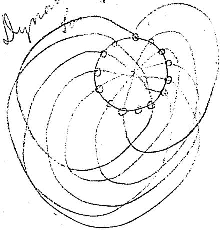
attempt at non commutator

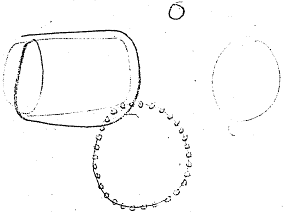



c

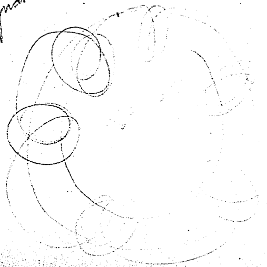


Dynamo for make Gramme and Siemens

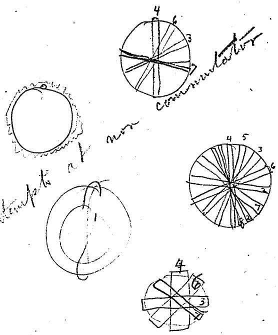




Dynamo

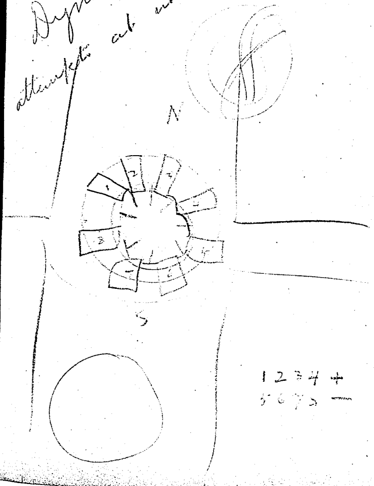


attempts at non commutator

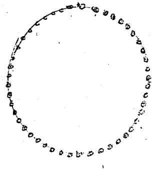

4
6
3
1
4 5
3
6
2
7
5 8
4
6
3

Dynamo mach

attempts at non commutator


N
1
2
3
4
8
5
6
7
S

1 2 3 4 +
5 6 7 8 —

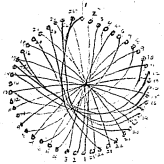


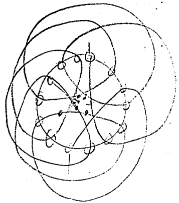
47

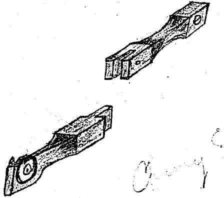
48

5

Dynamo Commutator

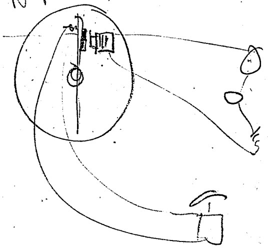


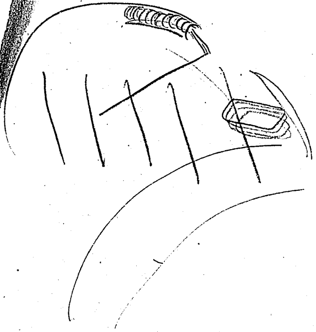




Slot wants to be cut opposite way ~~[illegible]~~ as shown in drawing

Dynamo Machine
with magnet





Feb 19 1911

Ex. No. 53 Tried to link up the 46 commutators into seven groups. Did not succeed. see Book   for diagrams

Ex. No 54 Made seven new commutator plates [illegible] over the old

Ex. No. 55. Put the current from the Gramme into the magnet of the Edison and found that the magnet turned much harder.

Ex. No. 56 Put the current into the magnet of the Gramme and found its place where the ring turned a little harder

Ex. No. 57 The current passing through the whole machine gave a strong pull. The hand on the shaft could turn it the other way. Seven cells of battery used, fresh connected in series.

Ft. 79 Ex. No. 58

~~I tried not~~ Mr. B— tried mixture to close glass to a brass case

For drawings for glass cases see

Ex. No. 59 Feb. 19

Tried Dynamometre. Found that there was too much friction on the spring. For plan of dynamomometre see

~~wanted~~ Mr. E suggested a spiral spring. Then that a magnet be used to drag the bar with it, and the current ~~broken~~ noted at the time when the bar freed.

Ex, 60

The battery put on Gramme and ~~then~~ ring run. Three iron wires heated four feet long. When the Gramme ran its own field three wires very hot, two not as hot and one barely red.

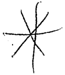
Ex. 61 The Gramme used to run the field of the Edison a ~~[illegible]~~ very strong drag on the belt was noticed when the current was put on.

156

140
21
140
280
12)2940(241
24
54
48
20

2
482

ask to wind



Ends 189
5
12)945(79 ft
84
105

|||||| 34 ft

Feb 20

157

No. 14 .83

5 Armature Edison wound
5 m drum

5

4.97
3.15
3.15
5
.083)15.750(189.
83
745
664
810

18.9
21
189
378
12)3969(330
36
36
36
9

330 ft of wire
1/2 Ohm

Wire .75 Ohm

Resistance Gramme

magnet .75 Ohm
ring .60 Ohm

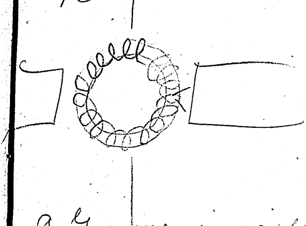
Wallace

16.7
.75

Total 16 Ohms

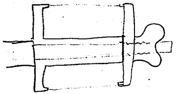
3.3
.75
2.65 Ohms

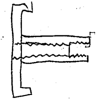
Feb 20 1878

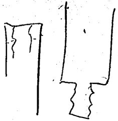


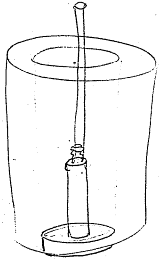
A Gramme ring could be made with one side open, this side could be used for Jablochkoff the continuous side for making the field magnet. E

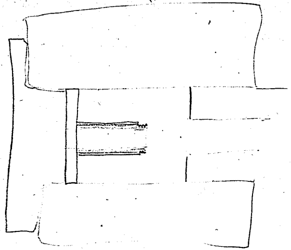
Pages 163 to 175. "Telephone Sketches." Unimportant.

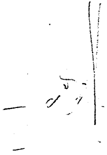


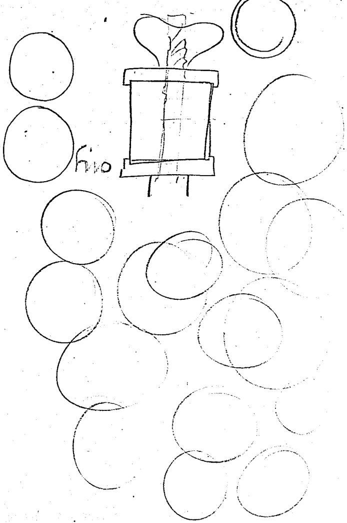








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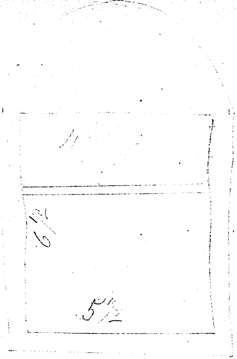
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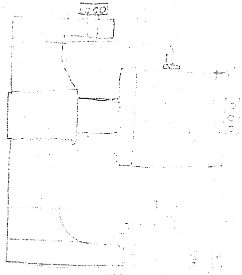
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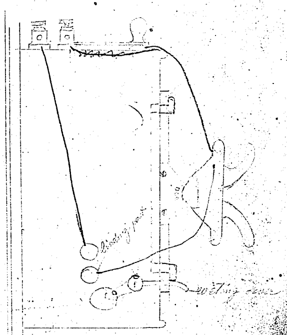
Electro Motograph Telephone

Feb 24th 1879


Binding post
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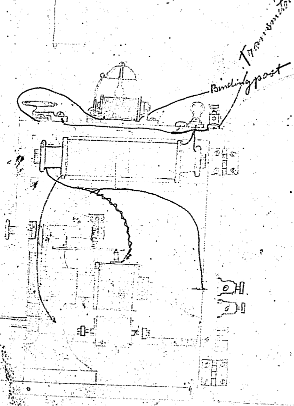
Electro motograph telephone

Feb. 24th 1879

J.K.


Transmitter
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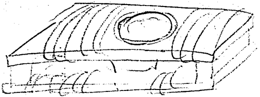
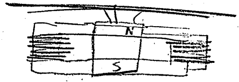
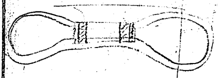
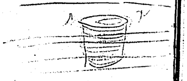
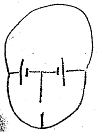
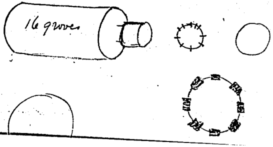










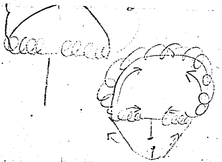


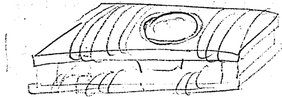
Edison Laboratory Note Book No. 4.

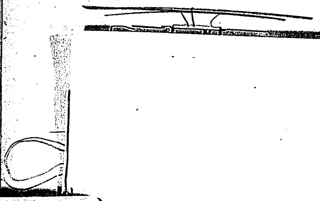
Pages 176 to 181.

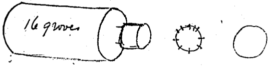
Dynamo Machine Sketches.

See Edison Patent:
219,393





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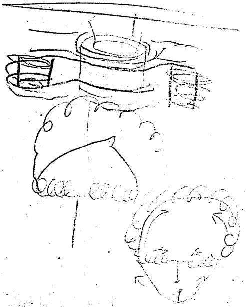

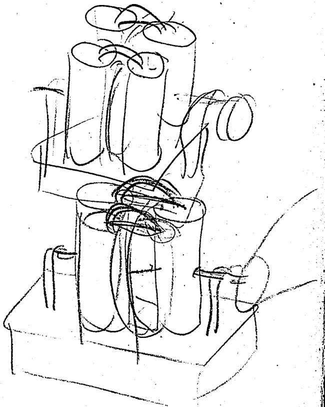

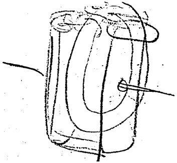

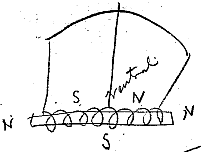
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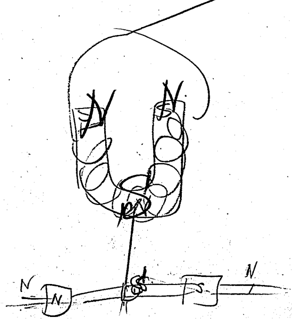

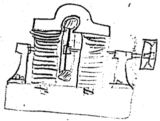

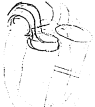

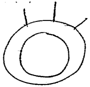

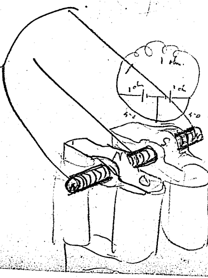
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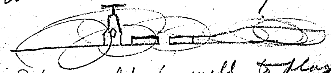
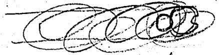
The binding post must be placed as near as possible to the connecting post and the wire fastend to the other connecting post.

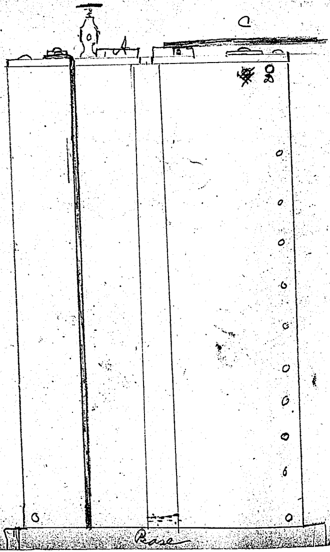


It would be well ~~to place~~ the binding post in the place of the screw next to the connecting block



Only one binding screw needed, a hole should be made under it in the wood

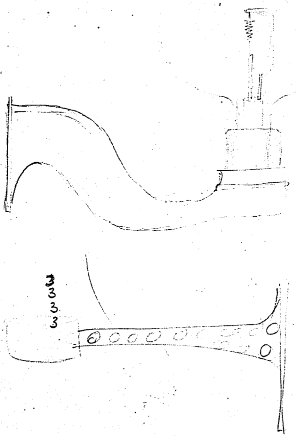
Pages 182 to 185. "Old Resistance Boxes extensively use



Put binding post in screw hole next to the connection block A. Attach wire to other block B.

One connection screw C with a hole D under it

Wire from the screw to a large copper fuse smaller wire over it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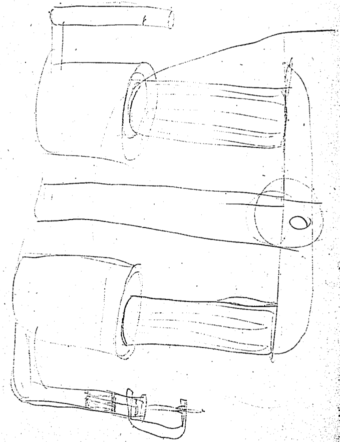

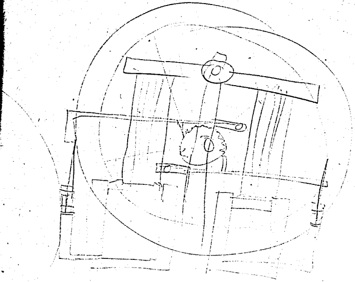

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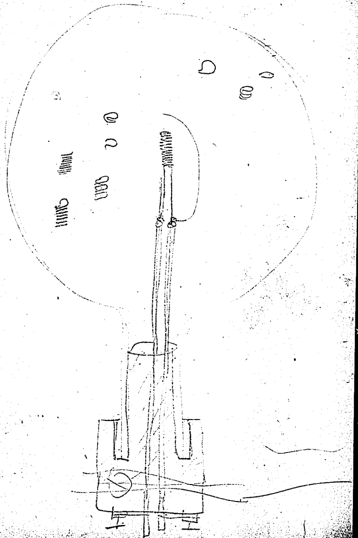

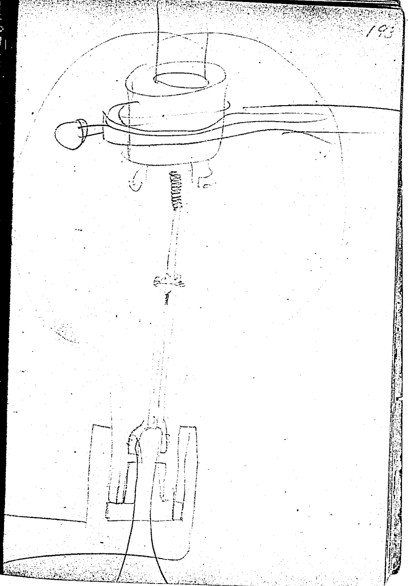

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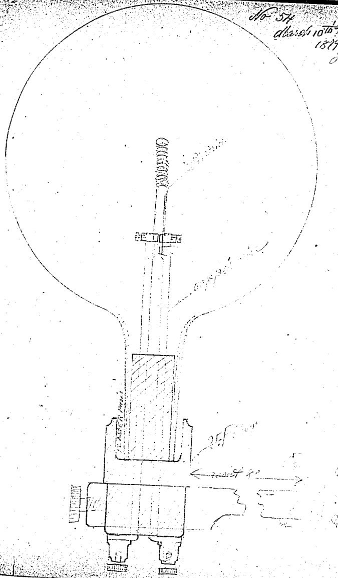
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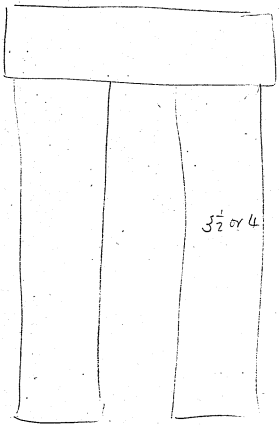
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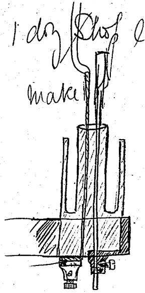

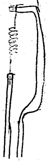

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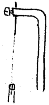

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April 4 to 1879
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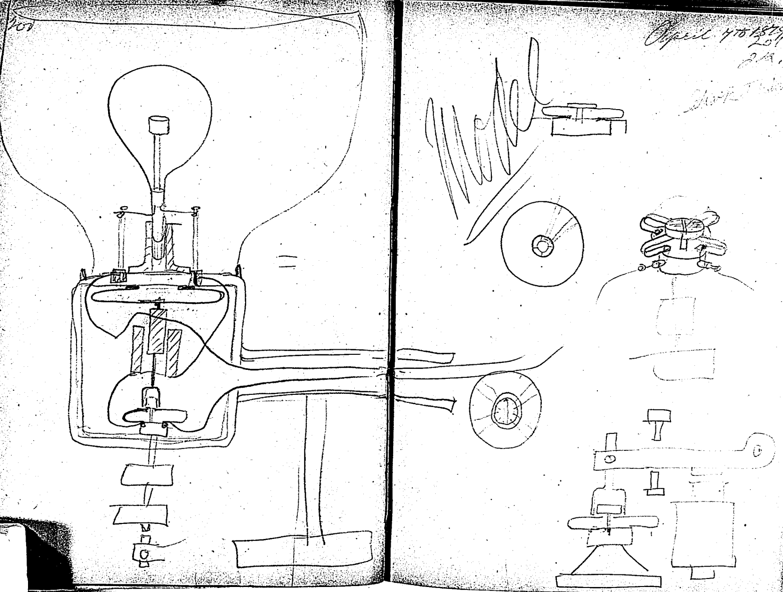

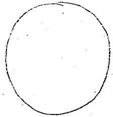

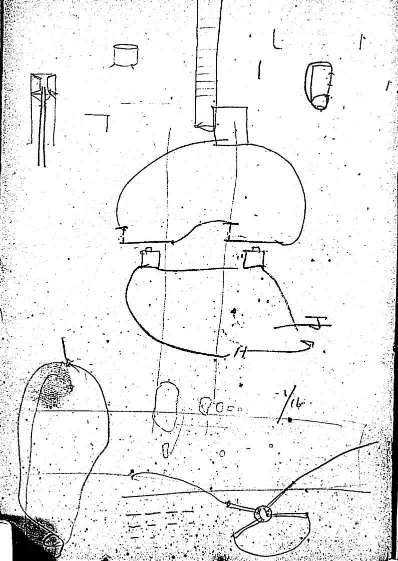
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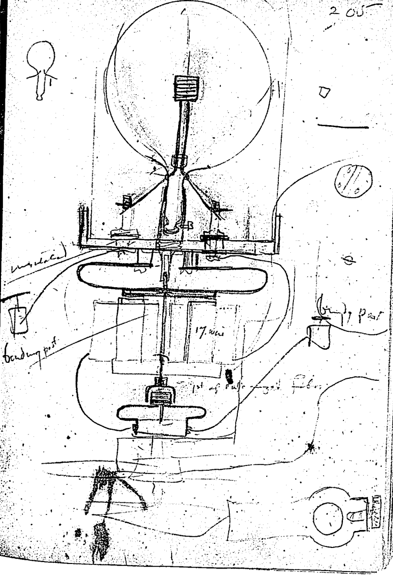
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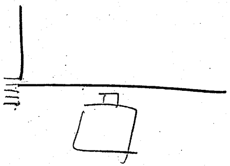

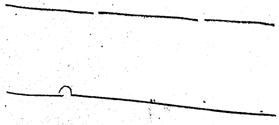

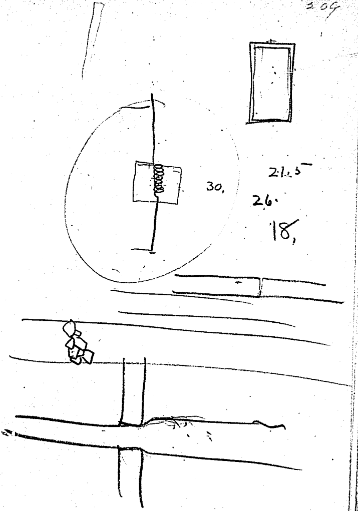
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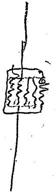

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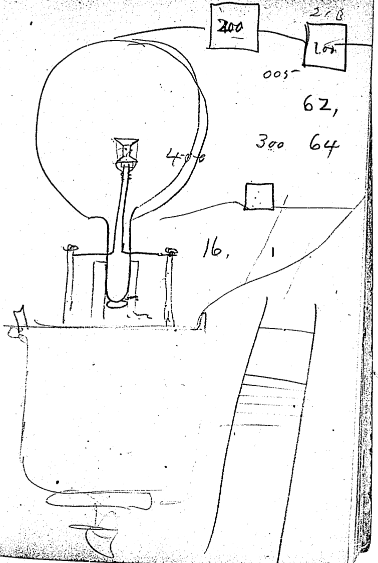
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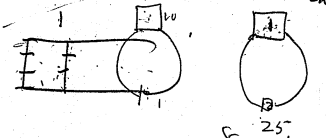

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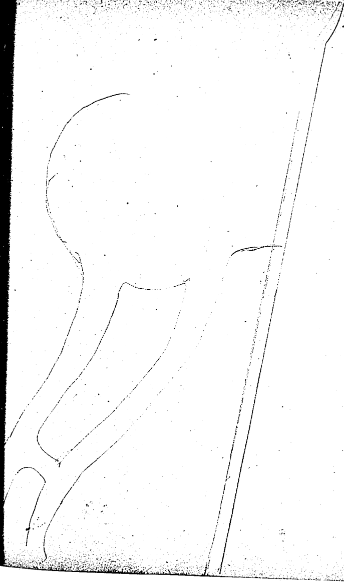

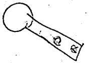

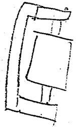

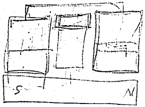
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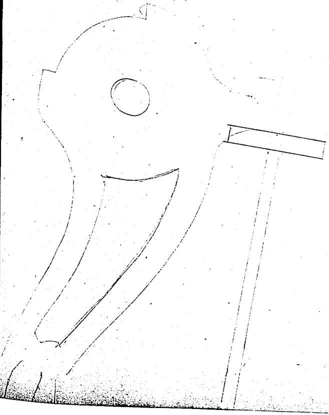

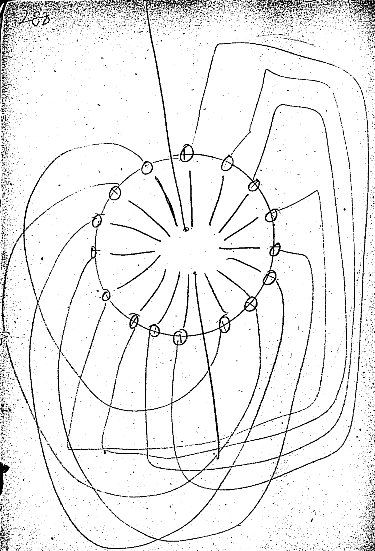

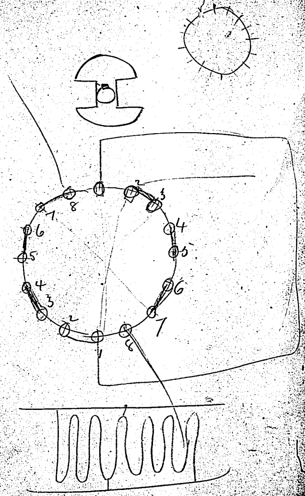

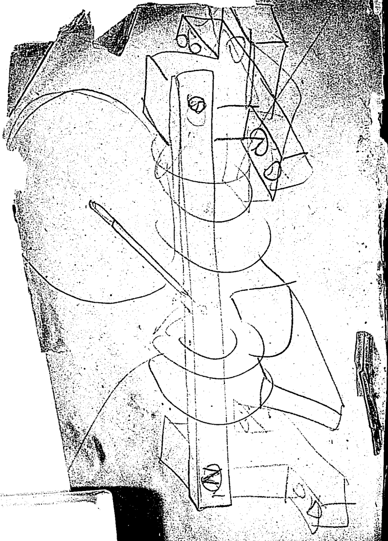

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